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The Role of AI in Enhancing Human Creativity and Productivity

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Abstract

Artificial Intelligence (AI) is a transformative force in enhancing human creativity and productivity across industries. This article explores AI's role in automating tasks, optimizing decision-making, and fostering innovation in creative fields such as design, film, music, and

journalism. AI-driven tools assist in streamlining workflows, reducing costs, and enhancing efficiency without compromising human ingenuity. Case studies illustrate AI's contributions to scriptwriting, music composition, and automated news generation, showcasing its ability to

collaborate with professionals rather than replace them. However, ethical concerns, data privacy issues, and the need to preserve human creativity in an increasingly automated world remain key challenges. AI's relevance extends beyond creative fields to industries like healthcare, agriculture, and business, where it aids in diagnostics, resource optimization, and market predictions. The article highlights the importance of responsible AI integration, ensuring ethical implementation while leveraging AI's capabilities to augment human potential. The future of AI lies in human-machine collaboration, where technology enhances creativity and productivity rather than diminishing human input. By embracing AI as a complementary tool, individuals and organizations can achieve greater efficiency, innovation, and creative excellence while maintaining ethical standards and the essential human element in decision-making and artistry.

Keywords: Artificial Intelligence, Creativity, Productivity, Automation, Innovation, Ethical AI, Human-Machine Collaboration, Decision-Making.

1. Introduction

One of the most impactful technological advancements of the 21st century is Artificial Intelligence (AI). It has completely transformed several industries and redefined the human approach to many routine tasks. From automating repetitive workflows to providing totally unique insights, you could say that AI has taken the place of "power tools" for all of us who make things and

do creative work (Russell & Norvig, 2020; Brynjolfsson & McAfee, 2014). In the creative industries, including design, advertising, and the arts, AI creates new opportunities, allowing professionals to come up with distinct ideas and work with newfound efficiency. In business and organizational management, AI-powered tools serve as decision-making helpers, working both faster and more reliably than any human being could manage. But AI's beneficial ease is also a

big part of the problem: it raises ethical challenges, privacy concerns, and a much larger question about how to maintain a necessary human element in an increasingly automated world (Bostrom, 2014).

In creative industries such as design, advertising, and the arts, AI generates new possibilities, empowering professionals to develop unique ideas while improving efficiency. Similarly, in business and organizational management, AI-driven tools streamline decision-making, increase operational speed, and foster innovation. However, these benefits come with challenges, including ethical concerns, data privacy issues, and the need to balance automation with human ingenuity.

AI's ability to complement human creativity and productivity lies in its capacity to automate mundane tasks, analyze vast datasets, and provide actionable insights. This allows individuals and organizations to allocate their energy toward strategic and imaginative pursuits. For AI to fully realize its potential, its integration must be grounded in principles that ensure ethical use, inclusivity, and collaboration between humans and technology.

The artificial intelligence (AI) field was founded academically in the 1950s, yet it did not receive practically the deserved interest until the big data revolution and the post-digital era (Fountaine et al., 2019; Haenlein and Kaplan, 2019).

The theory of creativity originated from Vygotsky's theory, which emphasizes the impact of formal education on the development of creativity. He suggested that individuals who continually add to the pool of knowledge develop a rich imagination that serves as a foundation for creativity (Worst, 2007).

The rapid advancement of Artificial Intelligence (AI) and Machine Learning (ML) has significantly transformed various industries, from healthcare and finance to automation and cybersecurity. However, the effectiveness of these technologies

largely depends on selecting the appropriate algorithms based on specific applications. This study aims to analyze and compare commonly used AI and ML algorithms, highlighting their strengths, limitations, and optimal use cases. By understanding these aspects, researchers and practitioners can make informed decisions while implementing AI-driven solutions, leading to improved performance and efficiency in real-world scenarios.

2. Review of Existing Literature

The many industries that employ Artificial Intelligence (AI) have seen it become an increasingly vital part of their operations. Banks, hospitals, and even governments are using AI to improve productivity and efficiency in their organisations. But what about the industries that are typically thought of as creative? Those in the art and media world might assume that AI is too rational, too logical, and too programmed to play a role in the inspiration, improvisation, and invention that is purportedly the domain of human beings. Yet, over the past several decades, we have seen the introduction of programs that can compose music, paint pictures, and create visual effects in movies--all without much assistance from humans. When left to their own devices, these AI-driven programs can create works that are often indistinguishable from those created by human artists. Or so we are led to believe. Al Naqbi, Bahroun, and Ahmed (2024) conducted a thorough literature review to examine the effect of Generative AI (GAI) on workplace productivity in several key professional sectors: academia, research, business, government, and technology. The comprehensive nature of their review—rooted in the analysis of 159 research publications—enables a nuanced understanding of an emerging and rapidly growing area of interest. GAI, in the form of AI-powered chatbots and conversational AI, is rapidly being integrated into various workplace environments. ChatGPT seems to be leading this movement and is now a dominant tool

for knowledge management. These authors took the opportunity to discuss possible ethical implications of these nascent technologies and their potential (or lack thereof) to disrupt workplace productivity (Al Naqbi, Bahroun, & Ahmed, 2024). AI also simplifies laborious tasks like research, organization, and proofreading, allowing students to allocate more time to critical thinking and nurturing their creativity (Mondal, 2023). In the realm of design, a traditionally collaborative and inherently social endeavour (Rampino, 2018), a seismic shift is underway. This transformation is driven by the integration of artificial intelligence (AI) into the design workflow (Yildirim et al., 2022). The contours of teamwork are changing rapidly with the introduction of AI-enabled technology in human teams. The inclusion of AI in teams focuses on using the strengths of both humans and AI to improve mission performance over what humans and AI can accomplish on their own (Ezer et al. 2019). The design industry is being transformed by AI, which is allowing unprecedented efficiencies to be achieved. These are no longer just assistive tools; rather, AI has become a valuable collaborator in a designer's creative workflow. Nasir et al. (2024) describe the current design landscape as one marked by unprecedented efficiency and inclusivity, where production time and costs are significantly reduced without compromising human creative integrity. Designers now have access to advanced tools that enable a remarkable level of personalization, allowing both individuals and large teams to craft outputs tailored to specific needs and preferences. These tools also support a wide range of design complexities while ensuring high legibility, making the outputs universally accessible, including for users with disabilities. This convergence of speed, customization, and accessibility represents a transformative shift in the creative industry, empowering designers to maintain artistic value while meeting diverse user expectations. Rapid advancements in artificial

intelligence (AI) technologies have created numerous opportunities for businesses to improve their operations, customer service, and data analytics, and, consequently, to gain a competitive advantage in their respective industries (Collins et al., 2021; Davenport and Ronanki, 2018). Artificial Intelligence (AI) has traversed a storied path, sparking both excitement and apprehension. It has long been a contentious topic (Dreyfus and Hubert, 1992; Cao et al., 2021), with continuing debates surrounding its efficacy and implications. Recently, there has been a surge in interest within the business community as AI is poised to become the defining technology of the 21st century (Brem et al., 2023; Magistretti et al., 2019; Brynjolfsson and McAfee, 2017). The adoption of generative artificial intelligence (GAI) by organisations is redefining various aspects of business operations, from practices and processes to business models and innovation, potentially leading to a new era in the employment and work landscape (Budhwar et al., 2023). The integration of AI in services is revolutionizing frontline interactions, enhancing service productivity, and redefining service strategies (Huang & Rust, 2017, 2018, 2021; Rust & Huang, 2012, 2014). Moreover, AI-generated outputs have proven so convincing in practical scenarios to even fool experts in whether content was created by humans or AI (e.g., with a scientific abstract, Else 2023; with artificially generated art, Haase et al. 2023a), one of the most substantial possible benchmarks. This evidence underscores the argument that generative. In the same vein, Adeleye (2024) investigated the influence of artificial intelligence on creativity and efficiency in design. The study underscored the ability of AI to handle automatable problems, generate diverse design iterations, and furnish data-driven insights about what kinds of designs people like. The research also raised the ethical implications of grunt work being turned into what may someday be a fully autonomous design assistant. Will there still be a human touch if design no longer requires human hands? If all

design can become "generative" because an AI can run the equivalents of thousands of sketches, blueprints, and computer models every second, then what are the implications for human imagination or innovation? (Adeleye, 2024). In high-tech companies, the adoption of AI has really taken off, resulting in positive changes for innovation, decision-making, and operational efficiency. A 2024 study carried out by Ali and colleagues looked closely at 125 U.S.-based high-tech firms and found that AI really boosts innovation. The creativity and ease of the company's workforce was really enhanced by the streamlined processes brought in with AI, but it also bought us something much more important: decision-making precision. This study also touched on something incredibly relevant to our discussions today: the responsible implementation of AI and having governance frameworks in place. We can't have decision-making enhancements, process improvements, or operational efficiency if we're doing it all in an unethical manner (Ali et al., 2024).

The overall literature suggests that AI is a rapidly advancing transformative technology across multiple domains. It may significantly affect the decision-making processes of organizations. Potential benefits of using AI in the future look promising, bringing improvements in efficiency, enhancements in creative processes, and boosts in "better" decisions across various domains. Yet with potential benefits come concerns for organizations. Those concerns are predominantly about the ethics of using AI to make decisions. And for good reason. Experts say organizations that use AI have to think about ethics because the decisions made by the AI may impact the lives of many people.

3. Scope of the Article

The article explores the role of Artificial Intelligence (AI) in enhancing human creativity and productivity across various industries. It examines AI's ability to automate repetitive tasks,

generate unique insights, and collaborate with humans in creative fields such as design, advertising, and the arts. Additionally, the article highlights AI's contribution to decision-making processes in business and organizational management. While discussing the benefits, it also addresses ethical concerns, data privacy issues, and the importance of maintaining a human element in an AI-driven world.

4. Objectives of the Article

- To analyze AI's impact on human creativity and productivity, understanding how AI-powered tools assist professionals in generating ideas, improving efficiency, and streamlining workflows.
- To review existing literature on AI's role in creative industries – Examining research studies that highlight AI's influence on design, media, and entertainment.
- To assess AI's role in business and decision-making, exploring how AI enhances operational speed, innovation, and precision in corporate environments.
- To identify ethical and privacy concerns related to AI, discuss potential risks, including bias, data security, and the need for responsible AI governance.
- To evaluate AI's collaborative potential – Demonstrating how AI complements human intelligence rather than replacing it, fostering a partnership between technology and human ingenuity.
- To provide case studies on AI's application in different sectors – Presenting real-world examples of AI-driven innovations in film, music, journalism, and business decision-making.
- To propose recommendations for the ethical use of AI, suggesting best practices to ensure AI integration remains ethical, inclusive, and beneficial to humanity.

5. Definition of AI and Its Relevance in Contemporary Society

The field of study known as artificial intelligence encompasses the myriad systems and technologies that approximate the human cognitive process. They permit machines to do such things as learn, reason, and solve problems and make decisions with a semblance of human intelligence. This is not to say that the machines do this in the same way that humans do it. In fact, they may not be "intelligent" at all in the way humans are. The principal way in which these systems seem "intelligent" and perform better (or as well as) humans is through the use of vast amounts of data and the principal AI strategies of machine learning, neural networks, and natural language processing (Russell & Norvig, 2020). AI refers to systems and technologies designed to simulate human intelligence, enabling machines to perform tasks such as learning, reasoning, problem-solving, and decision-making. Key advancements in machine learning (ML), neural networks, and natural language processing (NLP) have driven the evolution of AI, making it applicable across diverse fields. In today's interconnected and data-driven society, AI is highly relevant due to its ability to address complex challenges and improve efficiency across industries. For instance:

- **In Healthcare,** AI supports diagnostics, treatment planning, and patient communication through tools like ChatGPT and diagnostic algorithms.
- **In Agriculture,** AI optimizes crop yield and resource allocation, promoting sustainable practices.
- **In Communications,** AI enhances personalization in media, marketing, and customer service, improving user experiences.
- **In Creative Fields,** AI inspires innovation by generating ideas, automating design processes, and enabling real-time customization.

The relevance of AI lies in its adaptability to human needs. By processing and analyzing vast amounts of data, AI offers solutions that would be otherwise impossible or highly time-consuming. Its ability to scale across various sectors underscores its importance in shaping the future of work, creativity, and innovation.

6. Creativity and Productivity: Essential Human Endeavours

The engine of human advancement is creativity and productivity. Across cultural, scientific, and technological domains, they are the driving forces of progress.

Creativity: The ability to generate original ideas and solutions. It is the fruit of imagination, intuition, and exploration. In the realms of art, design, and storytelling, creativity is the sine qua non for producing works that are impactful and resonate on an emotional level (Bostrom, 2014).

Productivity: The efficient use of time, resources, and effort to generate desired outcomes. It is the almost obsessive focus on structured processes, goal-oriented actions, and results that can be measured. When we talk about AI being a "productivity tool," this is what we mean (Brynjolfsson & McAfee, 2014). Catalyzing the already dynamic duo of creativity and productivity, AI augments human potential in truly astonishing ways. For instance, AI instruments such as Adobe Sensei and Canva labour to do the design stuff that non-designers usually ask designers to do—like resizing and colour matching. AI takes care of those sorts of repetitive tasks so that designers can devote more of their time to the processes they do best: ideation and, to some extent, the sorts of things that design strategists do (IBM Watson, 2023). Business decision-making is becoming more efficient and less error-prone with the use of AI. It is not as if AI is taking over decision-making; it is more like AI is helping humans make better decisions at a quicker pace. (Russell & Norvig, 2020).

When it comes to research, artificial intelligence speeds up the process of finding knowledge. It does this by accelerating the discovery of complex datasets, pattern recognition, and solution suggestions (Bostrom, 2014).

7. Case Studies

7.1. AI in the Film Industry – The Rise of AI-Assisted Scriptwriting

Background

The film industry collects eternally creative brains. Those who write scripts for a living face many challenges, not the least of which concern the development of truly compelling narratives. (Two suggestions for doing so that are evidenced in the article: 1. hook your audience from the first scene, and 2. make sure to have a strong climax.) Anyway, could artificial intelligence one day write a script as well as—or better than—any human? Currently, the tools that AI uses are not good enough for that.

Implementation

Warner Bros. used algorithms enhanced with AI to break down audience data, script architecture, and box office performance trends. The audience was segmented. Former data was used to project potential outcomes for the film. Recommendations were then relayed back to the scriptwriters. (Depth and Echo, 2020).

Results and Impact

AI has significantly improved the efficiency of the script revision process by enabling faster turnarounds on change requests, allowing writers and production teams to save valuable time during development. Beyond just speed, AI has also enhanced creativity, with writers increasingly using AI-generated suggestions to refine plotlines and develop more compelling and engaging stories. Additionally, from a commercial standpoint, films developed with the assistance of AI have generally performed well; they have either achieved notable success or, at the very

least, maintained a level of mediocrity without becoming complete failures, indicating a promising trend in profitability and audience acceptance.

7.2. AI in Music Composition – The Role of AI in Soundtrack Creation

Background

Creative intuition and emotional depth are necessary for music composition. Tools for music generation powered by artificial intelligence, like AIVA and Jukedek, have appeared as collaborators for AI in composing film soundtracks and background scores (OpenAI, 2023).

Implementation

AI-assisted composition has been adopted by Hollywood studios to create orchestral arrangements, adjust harmonies, and improve auditory experiences (Brynjolfsson & McAfee, 2014).

Results and Impact

The automation of music production through AI has significantly saved time by handling the precision and repetitive tasks typically involved in creating music. This process can be likened to a form of "music by numbers," where AI quickly generates compositions that are often convincing enough to be accepted as music by general audiences or even by influential figures in the industry. While AI offers some degree of customization, its capabilities are limited by its reliance on classifications and categories, meaning it can only produce results that fall within the boundaries of what is considered "good enough." Additionally, AI enhances the collaborative aspect of music creation by working at remarkable speed and accuracy. However, it is important to recognize that the creative effort still originates from humans—the AI simply executes our intentions with the help of sophisticated computational power.

7.3. AI in Journalism- Automated News Generation

Background

Accuracy, speed, and contextualization are essential to journalism. Platforms based on artificial intelligence, like Wordsmith and GPT-4, have transformed how news articles are created, particularly for genres like financial or sports reporting, where the content tends to be more formulaic (Russell & Norvig, 2020).

Implementation

The Associated Press and Bloomberg, like many other media organizations, have been employing AI-driven writing software to help them produce large data-driven reports. What does this mean? In simple terms, it means that media organizations can now enlist the help of software to write the "who, what, when, where, and how" parts of a news story (IBM Watson, 2023).

Results and Impact

AI has rapidly transformed the field of journalism, enabling news reporting to be generated at unprecedented speeds and significantly boosting efficiency. Beyond just speed, AI has contributed to greater accuracy in the press by minimizing the human biases that often influence factual reporting, leading to more objective and reliable news content. Moreover, journalists are now leveraging AI tools to analyze large datasets that were previously underutilized, uncovering meaningful insights and patterns that enrich storytelling and support in-depth investigative reporting. This integration of AI marks a new era of journalism characterized by speed, precision, and data-driven narratives.

8. How AI Complements and Elevates Human Potential

Automating Repetitive Tasks

Handling operations that consume time, such as

data entry, analysis, and foundational decision-making, is where artificial intelligence (AI) demonstrates its greatest strengths (Brynjolfsson & McAfee, 2014). In the field of design, AI tools can automate the generation of layouts and enhance images, streamlining the creative process and allowing designers to focus more on innovation and less on repetitive tasks. Similarly, in customer service, AI-powered chatbots, such as those developed by IBM Watson (2023), efficiently manage routine queries, reducing response time and improving user experience. These applications reflect how AI is increasingly becoming integral to operational efficiency across various sectors.

Enhancing Decision-Making

The decision-making process is enhanced when AI is utilized to synthesize huge datasets and deliver immediate insights. (Russell & Norvig, 2020) Some examples: Enterprises predicting market trends and customer behaviour. Evidence-based AI-driven diagnostics make it possible for healthcare practitioners to use that information in decision-making.

Supporting Personalization

AI's ability to analyze user data and preferences allows it to deliver tailored solutions. This personalization enhances user engagement and satisfaction. Examples include E-commerce platforms leveraging AI to recommend products based on browsing history. Creative tools like The Grid dynamically adapt design elements to match user preferences in real time.

Encouraging Innovation

AI inspires innovation by expanding the possibilities of what can be achieved. Generative AI platforms, such as Deep Dream and GANs, enable the creation of unique artistic styles and groundbreaking designs. In architecture, generative AI produces innovative blueprints by exploring design variations that human architects may overlook. In the entertainment industry, AI

creates immersive experiences in virtual reality (VR) and augmented reality (AR).

9. Algorithms

9.1 Supervised Learning Algorithms:

- Linear Regression – Used for predicting continuous values.
- Logistic Regression – Used for binary classification tasks.
- Decision Trees – A tree-like model used for classification and regression.
- Random Forest – An ensemble learning method that improves decision trees' accuracy.
- Support Vector Machines (SVM) – Effective for classification with high-dimensional data.
- k-Nearest Neighbours (k-NN) – A simple, instance-based learning algorithm.
- Naïve Bayes – Used for probabilistic classification, commonly in text analysis.

9.2. Unsupervised Learning Algorithms:

- K-Means Clustering – Used for grouping data into clusters.
- Hierarchical Clustering – A method for building a hierarchy of clusters.
- Principal Component Analysis (PCA) – Used for dimensionality reduction.
- Gaussian Mixture Models (GMM) – Used for probabilistic clustering.

9.3. Deep Learning Algorithms:

- Artificial Neural Networks (ANNs) – Inspired by the human brain, used for complex tasks.
- Convolutional Neural Networks (CNNs) – Used in image processing and computer vision.
- Recurrent Neural Networks (RNNs) – Used for sequential data like time series and speech.
- Long Short-Term Memory (LSTM) – A type of RNN effective in handling long-term dependencies.

9.4. Reinforcement Learning Algorithms:

- Q-Learning – A value-based reinforcement learning algorithm.
- Deep Q-Networks (DQN) – A deep learning approach to reinforcement learning.
- Policy Gradient Methods – Used for optimising policies directly in reinforcement learning.

10. Here is a table comparing different Machine Learning algorithms based on key parameters:

Algorithm	Type	Strengths	Weaknesses	Common Applications
Linear Regression	Supervised (Regression)	Simple, interpretable	Sensitive to outliers	Predicting prices, trends
Logistic Regression	Supervised (Classification)	Works well for binary classification	Assumes linear decision boundary	Spam detection, medical diagnosis
Decision Tree	Supervised	Easy to understand, handles categorical data	Prone to overfitting	Customer segmentation, risk assessment
Random Forest	Supervised	Reduces overfitting, high accuracy	Computationally expensive	Fraud detection, recommendation systems
Support Vector Machine (SVM)	Supervised	Works well in high-dimensional spaces	Slow for large datasets	Image classification, bioinformatics
k-Nearest Neighbors (k-NN)	Supervised	Simple and non-parametric	Computationally expensive	Pattern recognition, recommender systems
Naïve Bayes	Supervised	Fast, it works well with text data	Assumes feature independence	Sentiment analysis, spam filtering
K-Means Clustering	Unsupervised	Fast and scalable	Sensitive to initial cluster placement	Customer segmentation, anomaly detection
PCA (Principal Component Analysis)	Unsupervised	Reduces dimensionality	Loss of interpretability	Image compression, feature extraction
Neural Networks (ANN, CNN, RNN, LSTM)	Deep Learning	High accuracy, handles complex data	Requires large datasets, computationally expensive	Image recognition, speech processing, NLP
Q-Learning	Reinforcement Learning	Learns optimal policies	Requires exploration-exploitation balance	Robotics, game AI

Table 1 Different Machine Learning algorithms

11. Machine Learning Workflow

The machine learning workflow begins with **data collection**, where relevant and quality data is gathered from various sources to serve as the foundation for model development. This is followed by **data preprocessing**, which involves cleaning, transforming, and preparing the data to ensure it is suitable for analysis—this may include handling missing values, encoding categorical variables, and scaling features. The next step is **model selection**, where an appropriate machine learning algorithm is chosen based on the nature of the problem and the dataset characteristics. Once the model is selected, the process moves to **training and testing**, where the model learns patterns from the training data and is then evaluated on a separate test set to assess its generalizability. The **model evaluation** phase involves measuring performance using metrics such as accuracy, precision, recall, or F1-score to determine how well the model is performing. Finally, the workflow concludes with **deployment**, where the trained and validated model is integrated into a real-world environment to make predictions or automate decision-making tasks.

12. Dataset

The study utilizes the Iris dataset, a widely recognized benchmark in machine learning, known for its simplicity and effectiveness in classification tasks. This dataset comprises 150 samples of iris flowers, which are evenly categorized into three distinct species: Setosa, Versicolor, and Virginica. Each sample in the dataset is represented by four numerical features—Sepal Length (cm), Sepal Width (cm), Petal Length (cm), and Petal Width (cm)—which serve as the basis for analyzing and distinguishing between the different species. The structured and well-labelled nature of the Iris dataset makes it an ideal choice for evaluating classification algorithms and understanding feature-based pattern recognition. The target variable in the Iris dataset represents the species of iris flowers and is categorized into three classes: 0 for Setosa, 1 for Versicolor, and 2 for Virginica. These numerical labels enable effective multi-class classification. For model training and evaluation, the dataset was split into two subsets, with 80% used for training and 20% reserved for testing. To enhance model performance and ensure that all features contributed equally during the learning process, the dataset was standardized using feature scaling prior to model implementation.

13. Performance Comparison Table and its explanation

Algorithm	Accuracy (%)	Precision	Recall	F1-Score	Execution Time (s)
Decision Tree	100	1	1	1	0.0008
Random Forest	100	1	1	1	0.1503
SVM	96.67	0.97	0.97	0.97	0.003
ANN	100	1	1	1	0.3811

Table 2 Performance Comparison

Performance Variations & Critical Analysis

The performance of different machine learning models on the Iris dataset—a widely used benchmark for classification tasks—offers valuable insights into their accuracy and computational efficiency. Both Decision Tree and Random Forest classifiers achieved 100% accuracy, effectively classifying all test instances. This high performance is largely due to the well-structured and clearly separable nature of the Iris dataset. However, Random Forest required more execution time because it is an ensemble model that averages the outputs of multiple decision trees, enhancing accuracy but at the cost of speed. The Support Vector Machine (SVM) model demonstrated slightly lower accuracy at 96.67%, yet had a minimal execution time of 0.0030 seconds, making it an ideal choice when computational efficiency is prioritized. In contrast, the Artificial Neural Network (ANN) also reached 100% accuracy but had the highest execution time (0.3811 seconds), due to the complexity of training multiple layers with backpropagation. These comparisons underscore how different algorithms perform under varying constraints, guiding model selection based on speed, accuracy, and dataset complexity.

14. Observations & Recommendations

Based on the experimental results, several practical recommendations can be drawn. For small, well-structured datasets like Iris, Decision Trees and Random Forests deliver excellent performance. However, for larger or noisier datasets, Random Forests are often preferred due to their robustness and ability to reduce overfitting. SVMs offer a strong balance between accuracy and speed, making them well-suited for moderately sized datasets or environments with limited computational resources. While ANNs demonstrate strong predictive power, they are computationally intensive and more appropriate for complex, high-dimensional, or unstructured data such as images, audio, or natural language.

Therefore, choosing the right model should depend not only on accuracy but also on dataset size, complexity, and available computing resources. This insight highlights the importance of aligning model selection with real-world constraints.

15. Conclusion and Future research prospects of the study

Artificial Intelligence (AI) has emerged as a powerful tool for reshaping human creativity and productivity across disciplines. Rather than replacing human effort, AI acts as a collaborative assistant, helping individuals elevate their work by automating repetitive tasks and offering data-driven insights. Through such collaboration, humans can focus more on innovation, strategic thinking, and emotionally intelligent pursuits. In creative fields, AI facilitates ideation and personalization; in business, it enhances decision-making precision and operational efficiency. These benefits collectively foster innovation and adaptability, streamlining workflows across sectors. However, this transformative potential must be approached with caution and responsibility. Ethical considerations—such as data privacy, transparency, and algorithmic bias—must be addressed to ensure AI remains a tool for equitable advancement. Importantly, the human elements of empathy, cultural sensitivity, and imagination must be preserved and prioritized in AI implementation. By fostering balanced integration, where AI supports rather than dominates human creativity, we can achieve sustainable progress that benefits both individuals and society. The future of AI lies not in replacing humans, but in amplifying what makes us uniquely human.

Future studies can build on current findings by exploring more advanced deep learning architectures, especially when working with large-scale or unstructured datasets. Convolutional Neural Networks (CNNs), which are well-suited for image and visual data, and Transformer-based

models, which have revolutionized natural language processing, offer powerful opportunities for improving accuracy and model flexibility. These advanced models can handle complexities beyond the reach of traditional machine learning algorithms. Additionally, optimizing model performance through hyperparameter tuning is a crucial area for further exploration. Techniques like Grid Search, Bayesian Optimization, and Genetic Algorithms allow researchers to fine-tune key parameters—such as learning rates, batch sizes, and regularization settings—resulting in better performance and reduced computational costs. Such tuning minimizes the need for trial-and-error and ensures that models operate at peak efficiency. Together, these future directions aim to push the boundaries of intelligent systems, enabling them to be more accurate, scalable, and aligned with human-centered goals.

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